

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Aaron Michael SMITH et al.

Title: DEMOUNTABLE BUILDING

Appl. No.: Unassigned

Filing Date: April 19, 2004

CLAIM FOR CONVENTION PRIORITY

Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

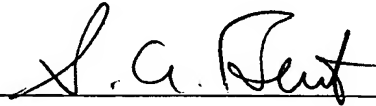
The benefit of the filing date of the following prior foreign application filed in the following foreign country is hereby requested, and the right of priority provided in 35 U.S.C. § 119 is hereby claimed.

In support of this claim, filed herewith is a certified copy of said original foreign application:

- AUSTRALIA Patent Application No. PR 8319 filed 10/17/2001.

Respectfully submitted,

Date 19 April 2004

By 

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5404
Facsimile: (202) 672-5399

Stephen A. Bent
Attorney for Applicant
Registration No. 29,768



Australian Government

Patent Office
Canberra

I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PR 8319 for a patent by AARON SMITH PTY LTD as filed on 17 October 2001.

WITNESS my hand this
Thirty-first day of March 2004

A handwritten signature in cursive script, reading "J. Billingsley".

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

APPLICANT: **AARON SMITH PTY LTD**

INVENTION TITLE: **DEMOUNTABLE BUILDING**

The invention is described in the following statement:

DEMOUNTABLE BUILDING

The present invention relates generally to demountable buildings and has been designed especially, but not exclusively, for use as buildings in remote locations.

5

BACKGROUND

Demountable buildings are typically permanent or semi-permanent structures which are used in activities requiring on site equipment and/or personnel for extended periods of time. These types of facilities are required in activities such as mining, construction, exploration, research, emergency services, aid organisations and armed services operations.

Permanent or semi-permanent structures of the prior art are erected at the site, and the various utilities such as power and water supply are shipped in separately. This approach has proven impractical in many cases particularly where the locations are remote and/or there is no readily available water or power supply in these regions. This has not only created problems in providing living and working conditions in these regions, but also makes construction of the actual facilities problematic.

Accordingly, it is an aim of this invention to provide an improved demountable building which ameliorates these problems and which is more easily installed and maintained, particularly in remote locations.

SUMMARY OF THE INVENTION

According to a first aspect of the invention there is provided a demountable building including, a plurality of modular compartments which are operative to be interconnected to form at least a major part of said building, each compartment being fitted out with functional elements to enable that compartment to perform a predetermined function in operation of said building, wherein said individual ones of said compartments including their functional elements, are operative to be connected to, or removed from, the other compartments of the building as a single unit to thereby facilitate installation, maintenance and removal of said building.

A building according to the invention may be used to provide one or more functions. Examples of such functions include accommodation, laboratories,

communication stations, other technical facilities, storage facilities, first aid facilities, toilet facilities or any other function that is required in the field.

Each modular compartment may include a compartment housing and functional elements which are fitted in or to the housing and which provide the compartment with a particular function. For example, a modular compartment providing toilet facilities may include toilets, washing and shower components and fitted to its respective housing. A compartment for providing sleeping facilities may be fitted with beds and washing facilities. A utilities compartment may be fitted with a generator, or a gas supply. A water tank compartment may be fitted with water supply facilities. A waste tank compartment may be fitted with functional elements for storage and/or treatment of waste. The functional elements are designed to be fixed to the compartment housing so that the compartments and the functional elements may be installed or removed as a single unit.

In a preferred embodiment of the invention, the building further includes a base, wherein the modular compartments are able to be interconnected by being releasably mounted to the base. The number of modular compartments that can be releasably mounted to the base can vary depending on the size of the modular compartments and the size of the base.

In a preferred embodiment of the building of the present invention, three or more modular compartments are releasably mounted to the base member. However, it is to be appreciated that the number of compartments may vary considerably depending on the requirements of the demountable building.

In one form, the compartment housing includes structural members. The structural members may be designed to allow each compartment to be fully self supporting to enable those compartments to be readily transported and handled. Further, in the embodiment where a base is included, the structural members may be designed to increase the bending strength of the base.

In a preferred embodiment, the demountable building is transportable. The building may be transported by any means either as a complete structure and/or in a disassembled state where the compartments are transported separately. The transportability of the buildings and the compartments facilitates both its installation and removal. It also assists maintenance of the building by

allowing individual compartments to be easily removed and replaced. Examples of suitable transport means include truck, train, boat/ship or plane, or combinations thereof.

5 Preferably, the base member may include a sliding means that allows the structure to be slid and/or lifted onto a transport means. Ideally the sliding means is a heavy-duty sled or skids incorporating lifting eyes. This facilitates the sliding or lifting of the demountable building onto an appropriate transport means such as an industrial tilt tray truck. Alternatively, the base member may be equipped with wheels to allow towing or lifting onto a transport means. As a
10 further alternative, the demountable building may be towable itself.

In a preferred embodiment, the modular compartments may be interconnected to other modular compartments in a stacked configuration. Any number of modular compartments can be stacked but preferably the height of the stack does not prevent transportation of the structure. The modular
15 compartments may vary in base area and volume depending on the function of each compartment.

In a preferred embodiment, the modular compartments are dimensioned to be of standard sizes, so that the building may be configured to perform one of a plurality of functions by interconnecting different modular compartments. The
20 modular compartments of the building may be configured to perform any one of the following functions: technical activity compartments, toilet and/or shower compartments, sleeping compartments, catering/kitchen compartments, office compartments, compartments for specialised equipment, compartments for water supply, compartments for waste storage, compartments for generation of
25 electricity, supply of gas, water pressure and hot water, and compartments for storage of equipment and/or resources.

Ideally, the compartments are categorised into types based on size and function. It is envisaged that the various types of modules include primary modules, secondary modules, utilities modules, tank modules, resource and/or
30 storage modules. Further, the different size modules may be of related size so that, for example, two utility modules is of equal size to one secondary module and two secondary modules is of equal size to one primary module. This further improves the flexibility of the building.

In a preferred embodiment, the primary module may have the following functions: work shop, toilets, laboratory, kitchen, meal room, first aid station, sleeping quarters.

5 In a preferred embodiment, the secondary module may be smaller than the primary module. Preferred functions may include toilet, store room, manual/microfiche room, computer/communications room. The utilities module may be a source of power, compressed air, gas, water pressure and hot water. The tank module may vary in size depending on single or multiple toilets and/or showers that are required. The tanks may be fitted with fill and pump out
10 connections as required.

It is preferred that the compartments connected to a building may be substituted with any compartments of the same size but for a different function, depending on the overall function required of the building. For example, in
15 changing the function of a demountable building from a toilet facility to a kitchen facility, a primary compartment having toilet facilities may be substituted for a primary compartment having kitchen facilities. At the same time, a utilities compartment providing electricity may be substituted for a utilities compartment providing both electricity and gas.

In a preferred embodiment there is provided a building wherein each
20 modular compartment includes at least one service connection which is operative to be connected to similar service connections of other modular compartments in the building. The service connections may consist of any type of connection to allow the modular compartments to function in the way they are intended. The types of service connections will determine what the service
25 connection contains. In a preferred embodiment, the service connection contains one or more hose lines and one or more cable lines. In a preferred embodiment, the service connection contains at least two hose lines and at least one cable line.

In a preferred embodiment there is provided a building wherein the base
30 includes at least one common service connection wherein the respective service connections of the modular compartments are arranged to be interconnected to the common service connection. The service connection may consist of any type of connection to allow the base to permit transfer of services from one

modular compartment to another. In a preferred embodiment, the service connection includes one or more hose lines and one or more cable lines. The service connections may be adapted so that when not in use, they may be capped or closed to prevent flow of services.

5 In a preferred embodiment there is provided a building wherein the service connection is any one of water, gas, electricity, or effluent.

In a further aspect of the invention, there is provided a modular compartment for use in a demountable building in any of the above embodiments, having functional elements to enable the compartment to perform
10 a predetermined function in operation, wherein the compartment is operative to be connected to, or removed from, other compartments or a base member.

It is convenient herein after to describe a preferred embodiment of the invention with reference to the accompanying drawings. It is to be appreciated that the particularity of the drawings and the related description does not
15 supersede the preceding broad description of the invention.

In the drawings:

Figure 1 illustrates a side elevation of a demountable building;

Figure 2 illustrates a sectional plan view of the building of Figure 1;

Figure 3 is an exploded view to an enlarged scale of a service connection
20 of the building of Figure 1;

Figure 4 illustrates a sectional plan view of the building of Figure 1 showing the functional elements of each compartment;

Figures 5 and 6 illustrate a sectional plan view of examples of demountable buildings having different functions; and

25 Figure 7 to 10 illustrate various other configurations of the building of Figure 1.

Referring initially to Figures 1 and 2, there is shown the demountable building 10 including a base member 11 and a series of modular compartments 12, 13, 14, 15 and 16 which are releasably mounted to the base.
30 The modular compartments include a primary compartment 12, secondary compartment 13, a utilities compartment 14, a waste tank and/or water tank compartment 15, and a resource storage/waste tank and/or water tank compartment 16. Each modular compartment is attached to the base at 17.

This permits ready removal of each compartment and exchange for another compartment of the same size but different function or the removal of two or more compartments to be replaced with a single compartment of larger size.

For the preferred embodiment the fully assembled demountable building 10 is sized to fit on an industrial tilt tray truck and has a length of 7.6m, a width of 2.5m and a height of 3.0m.

Each module can be an enclosed unit with four walls and a roof or can be an open unit with framework supporting items not required to be enclosed.

Primary compartment 12 has a length of 4.2m, a width of 2.4m and a height of 2.5m. One wall of the compartment includes windows 18 and 19 and door 20 for entry to the compartment. The primary compartment in this preferred embodiment is a shower/toilet base and includes shower recess 21, washbasin 22 and toilet 23 shown as functional elements in Figure 4.

Secondary compartment 13 has a length of 2m, a width of 1.0m and height of 2.5m. The secondary compartment in the preferred embodiment is a compartment containing a cleaners sink and a bucket filling facility 24 plus storage for mops/brooms 25, cleaning products and toilet/shower consumables 26.

Utilities compartment 14 of the preferred embodiment includes a generator 27, water pressure system pump and accumulator 28 and hot water service 29. The utilities compartment 14 is comprised of two separate modules, 14a, 14b, stacked one on top of the other with the pump and hot water service on the lower level of the module and the generator supported above.

Tank module 15 contains a water tank 30 as a functional element while tank module 16 contains an effluent tank 31 as a functional element. Water tank 30 provides water to the toilet and wash facilities of primary compartment 12 and the cleaners sink facility in secondary compartment 13. Utilities compartment 14 provides electricity and hot/cold water to both primary compartment 12 and secondary compartment 13 and electricity to tank compartments 15 and 16. Effluent tank 31 receive effluent/waste from primary compartment 12 and secondary compartment 13.

As illustrated in Figure 2, the base member 11 includes on its upper surface a plurality of fixed service connections 32, 33, 34, 35 and 36. These

fixed service connections are linked by a service conduit 38 which lies within the base. The service conduit 38 carries hoses and cables which permit flow of services between the modular compartments 12, 13, 14, 15 and 16 via the base member 11 when they are attached to the base member.

5 The service connections of the base member are illustrated in more detail in Figure 3. The service connection comprises a bulkhead plate 37 which includes a cable connection 89 and two hose connections 90 and 91 but can
10 comprise of any number of hose cable and other connection. Each of the connections is a socket adapted for releasable connection with corresponding service connections of the modular compartments. The service connection of
15 the base member is interconnected to other service connections of the base member by the service conduit 38.

 The service connections 53 of the compartments which aligns and fit with the service connection of the base member when the modular compartment is
15 mounted on the base member are in fixed positions within the compartments. Each service connection 53 can be in a corner of the modular compartment and consists of a box 39 having a cable 40, a hose for effluent 41 and a hose for
20 water 42. End 43, 44 and 45 of the cable 40 and the hoses 41 and 42 exits the box 39 on the inside of the modular compartment. The ends of these cables and hoses is adapted with connectors for the connection of functional elements.
25 In the case of the cable 40, the outlet 43 is a standard electrical connection. In the case of the hoses 41, 42, the effluent hose connection 44 is connected to toilet 23 and drains 45 and 46. The water hose connection 45 is connected to tap 47 and shower 48 facilities. The other end of the cable 40 and hoses 41
30 and 42 exit the box 39 on the underside of the modular compartment via connections 49, 50 and 51. When the modular compartment is mounted on the base member, the exit points of these cable and hose lines align with the bulkhead plate of the base member. Consequently, plug 49 is connected with socket 39 of the base member, connection 50 of the modular compartment is
35 connected with connection 40 of the base member and connection 51 of the modular compartment is connected to socket 41 of the base member.

 The base member 11 is configured with specifically positioned sites 17 at which the modular compartments can be fitted onto the base member. The

service connections 53 of the modular compartments are positioned within the modular compartments so that when each compartment is fitted to its respective position on the base member, the service connection 53 of that compartment is brought into alignment and connection with a corresponding service connection (32,33,34,35,36) on the base member. Thus, once fully assembled the service connections of the modular compartments are operatively connected to the base member and to each other via the service connections of the base member.

In use, water flows from water tank module 15 via service connection 53 and 35 into the base member. It then flows through the water hose in the service conduit 38 to compartment 14 via service connections 34 and 53. This provides the suction supply for water pressure pump 28. Water from the pressure pump then flows via service connections 53 and 34 into the base member. It can then flow through the water supply hose in the service conduit 38 and enter, for example, modular compartment 12 via service connections 32 and 53. Similarly, effluent exits modular compartment 12 via the connection between the service connections 53 and 32 and enters the base member. From here it flows through the service conduit 38 to the waste tank via the connection between service connections 36 and 53.

Electricity is generated in modular compartment 14 and flows through the connection between service connection 53 and 34. The current then flows through the cable in the service conduit and enters, for example, modular compartment 12 via the connection between service connection 32 and 53.

The underside of the base member of the demountable building has skids 54 which extend along the length of the base of the building. The skids facilitate sliding of the building along the ground and allow the building to more easily be loaded onto transport trucks. Attached to each skid at each end of the skid are tow rings 55. The building is loaded on a tilt tray truck by hauling it onto a tray using a tow chain that is attached to the tow ring 55 at one end of the base. The building is slid and lifted by tow rings 55 onto the tray of the tilt tray truck. It is then slid into position on the truck and secured ready for transport. The building can also be lifted by crane using the tow rings 55 at both ends of the base 11 and spreader bar and slings or chains (not shown). The building can also be lifted by an appropriate fork lift.

In operation, the demountable building is arranged to either be assembled off site or transported in a disassembled form and assembled on site. Similarly, when the demountable building is no longer required at a site, it can either be transported away from the site assembled, or disassembled at the site and transported in a disassembled form.

An advantage of the building is that it is easily maintained. If one aspect of the buildings operation breaks down, runs out or is filled and needs to be replaced, the compartment can be uncoupled from the building as a single unit and replaced with a compartment having the same function. For example, when water tank 30 runs out of water, the module 15 containing the empty tank can be readily removed and replaced with a module containing a full tank. Similarly, when waste tank 31 is filled, it can be readily removed and replaced with an empty waste tank by replacing module 16.

A further advantage is that the building can be easily reconfigured to perform a different function. For example, primary compartment 12, which provides toilet and shower facilities, may be removed and replaced with primary compartment 70 as illustrated in Figure 5. This compartment provides kitchen facilities and is fitted with a stove 71, oven 72, sink 73, refrigerator 74 and bench 75. In addition to the primary compartments, the secondary compartment 13 can be replaced with, for example, refrigerated compartment 76 and water tank compartment 15 with non-refrigerated 77 food storage compartments with water and effluent tanks in compartment 15. In this compartment the tanks may be stacked, effluent bottom and water top.

As one example of an alternative, primary compartment 12 may be replaced with compartment 80 as illustrated in Figure 6. This compartment provides sleeping facilities and includes beds 81 and 82, sink 83 and storage cupboards 84. Electrical outlets 85 and 86 provide power source for lighting and operation of electrical appliances. In addition, the secondary compartment 13 and tank compartment 15 may be substituted for a single toilet and shower facility having a toilet 87 and a shower 88 with water and effluent tanks in compartment 5.

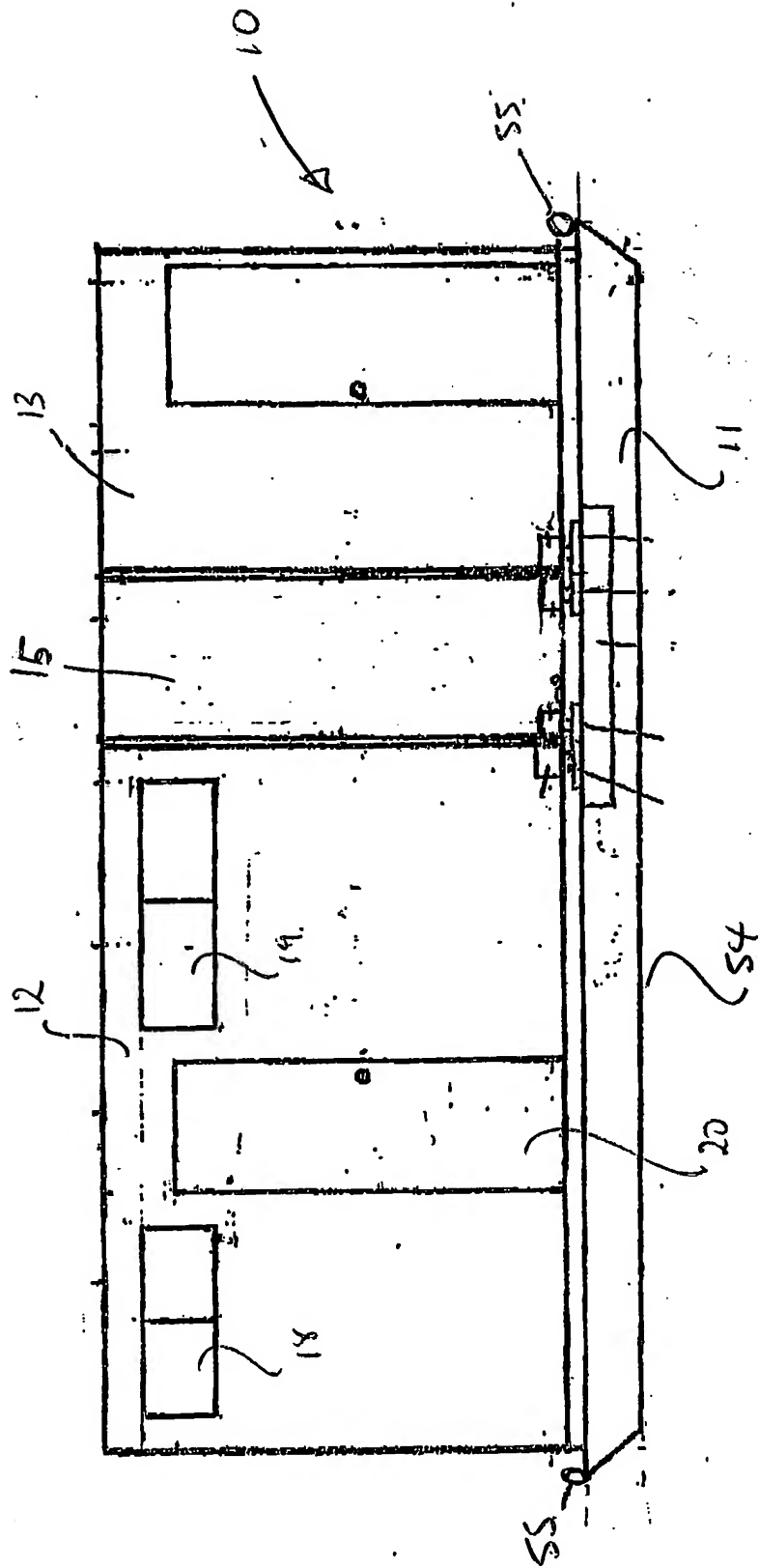
Accordingly, the present invention provides a demountable building which is ideally suited for use in remote locations and which is easy to install, maintain and remove and which may be reconfigured to suit a variety of applications

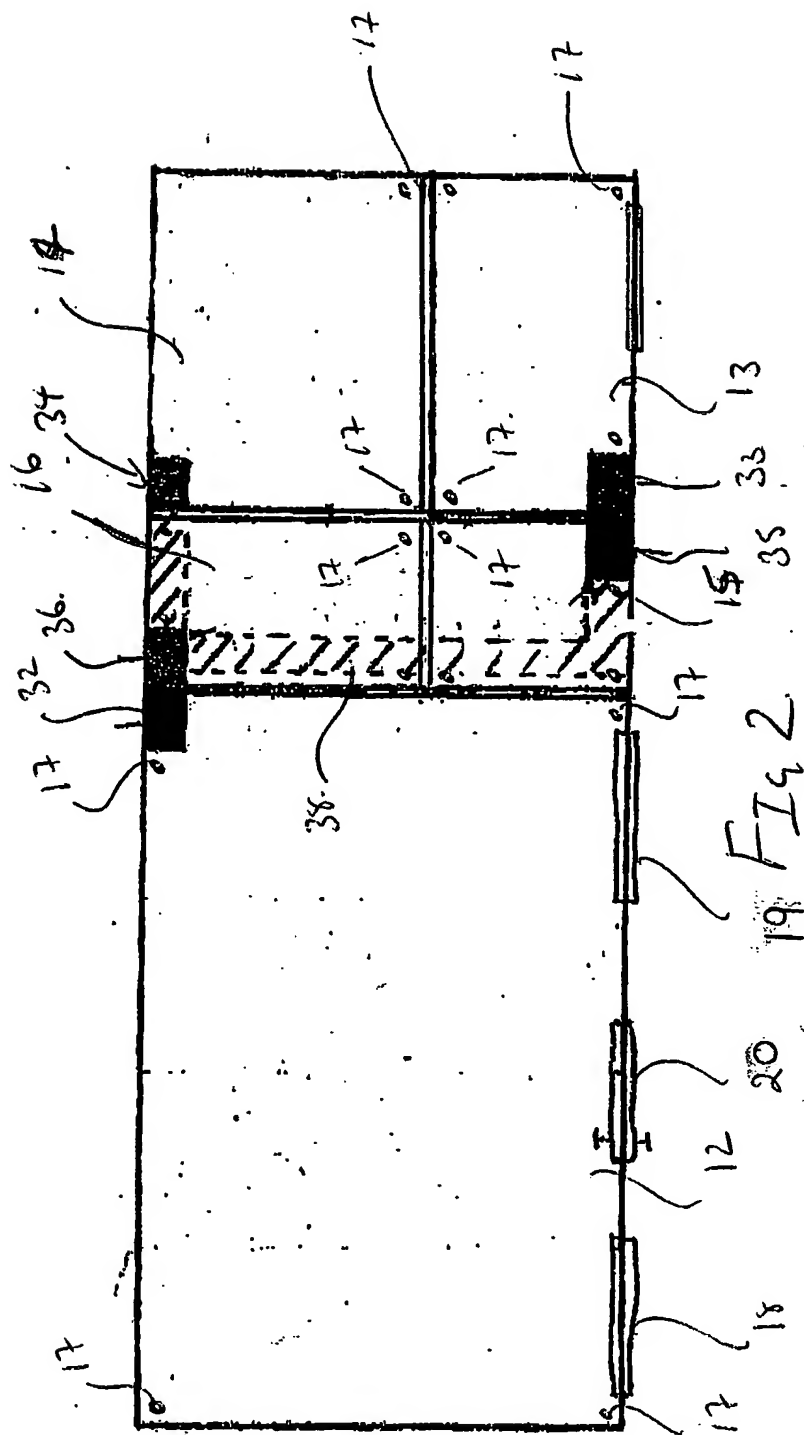
5 Finally, it is to be understood that various alterations, modifications and/or additions may be introduced into the construction and arrangements of parts previously described without departing from the spirit or ambit of the invention.

DATED: 17 October 2001

PHILLIPS ORMONDE & FITZPATRICK

10 Attorneys for **AARON SMITH PTY LTD**





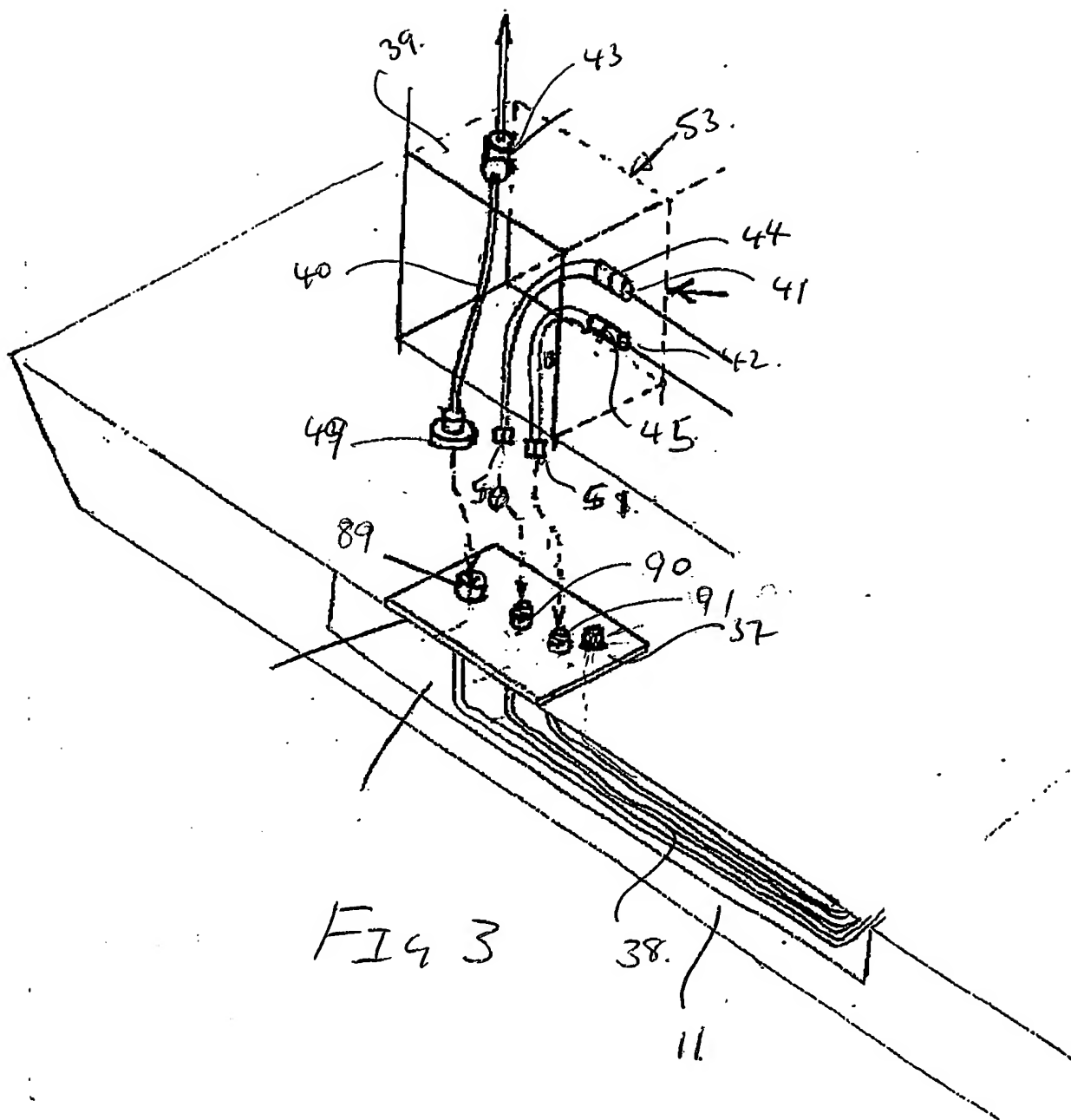


FIG 3

Fig 4. 14

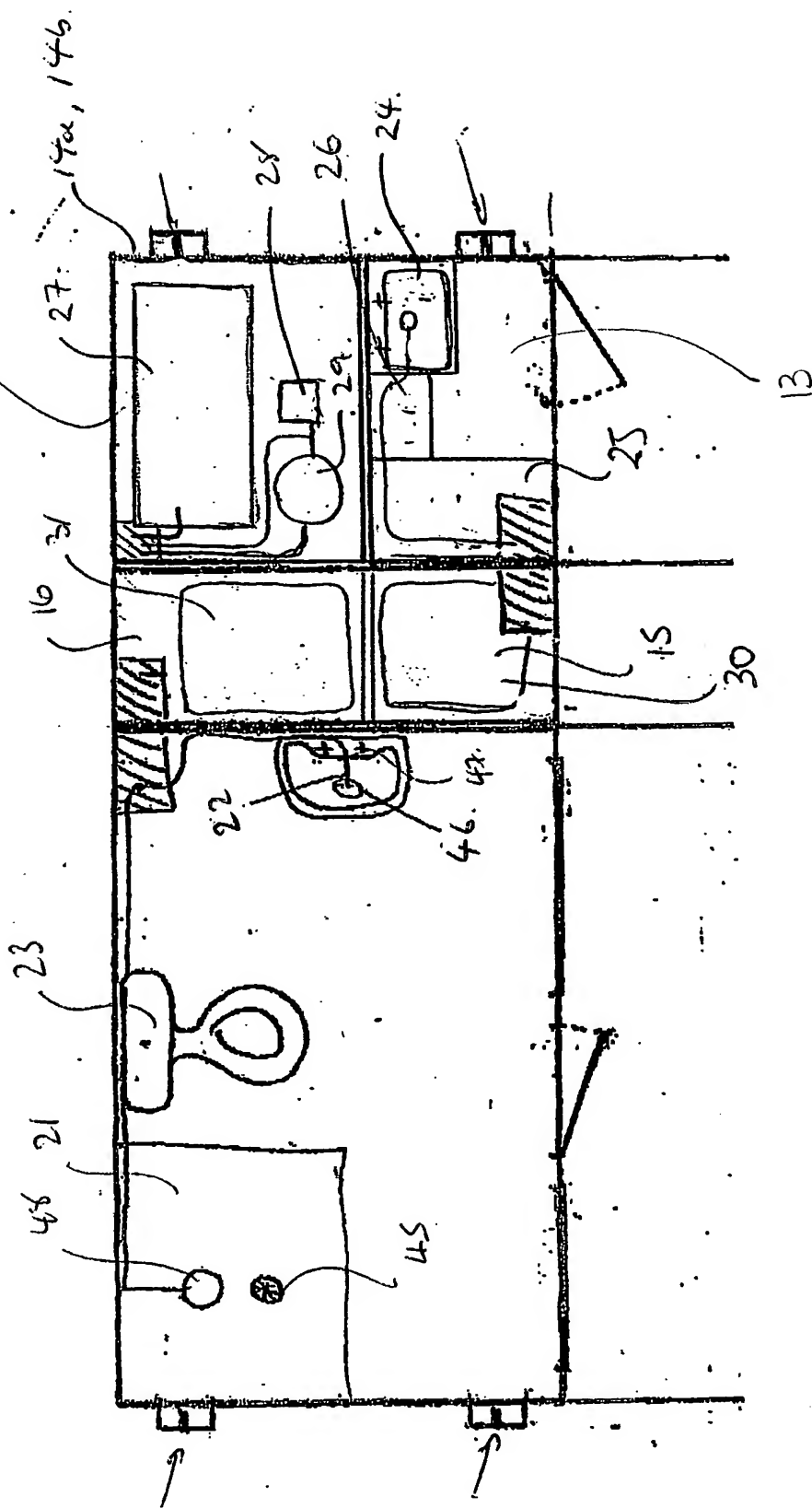


FIG 5

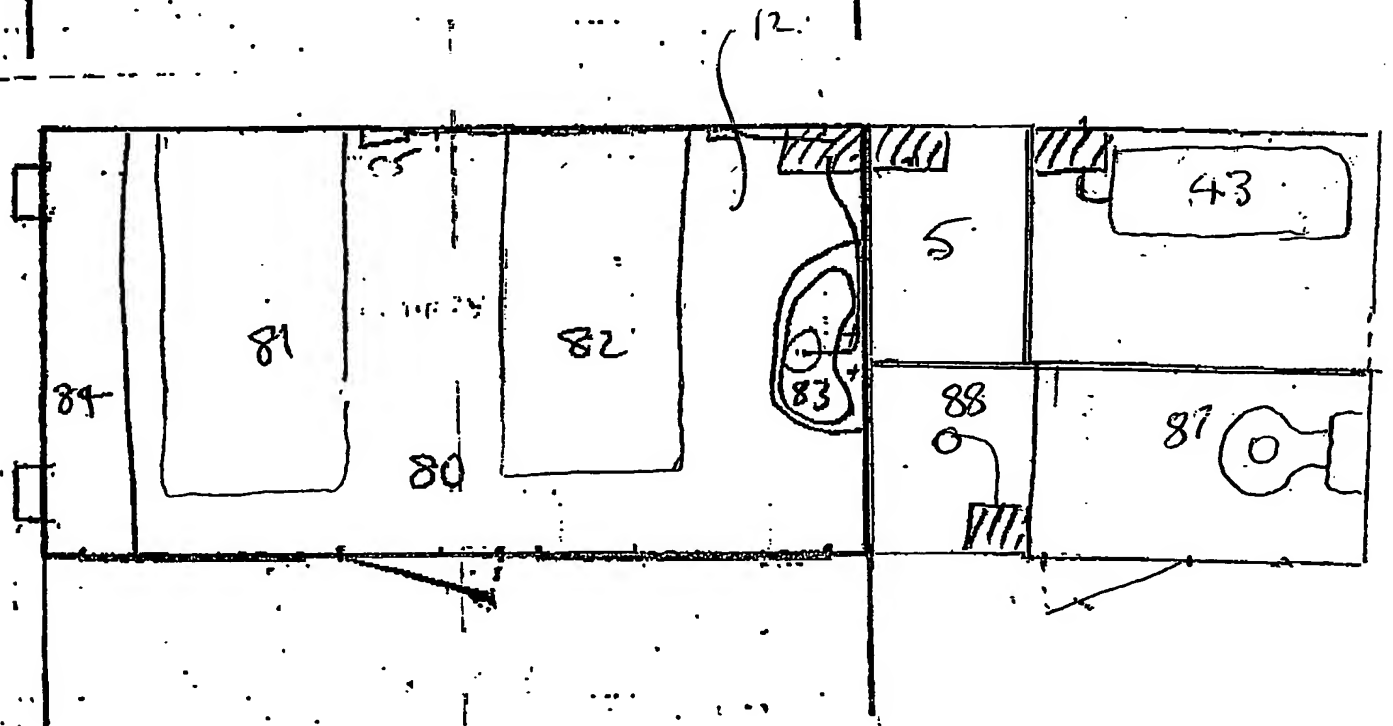
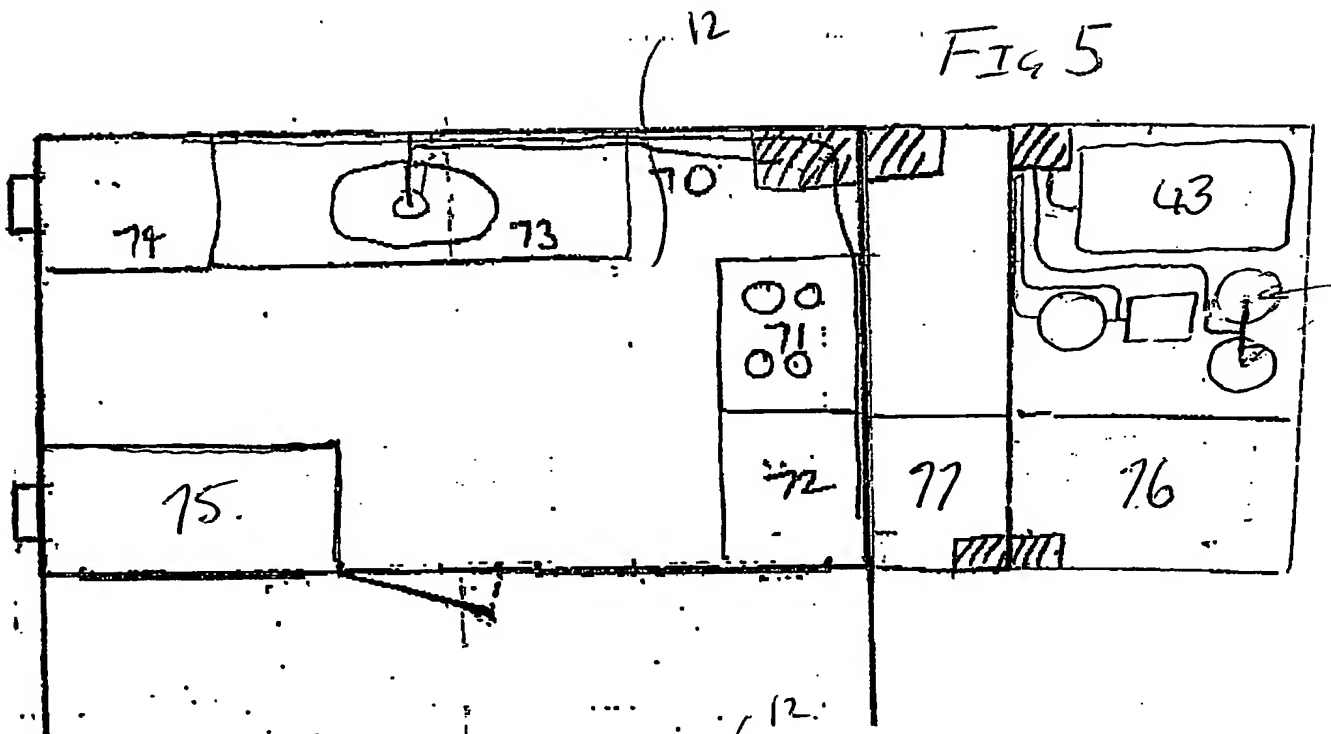


FIG 6

Fig 7

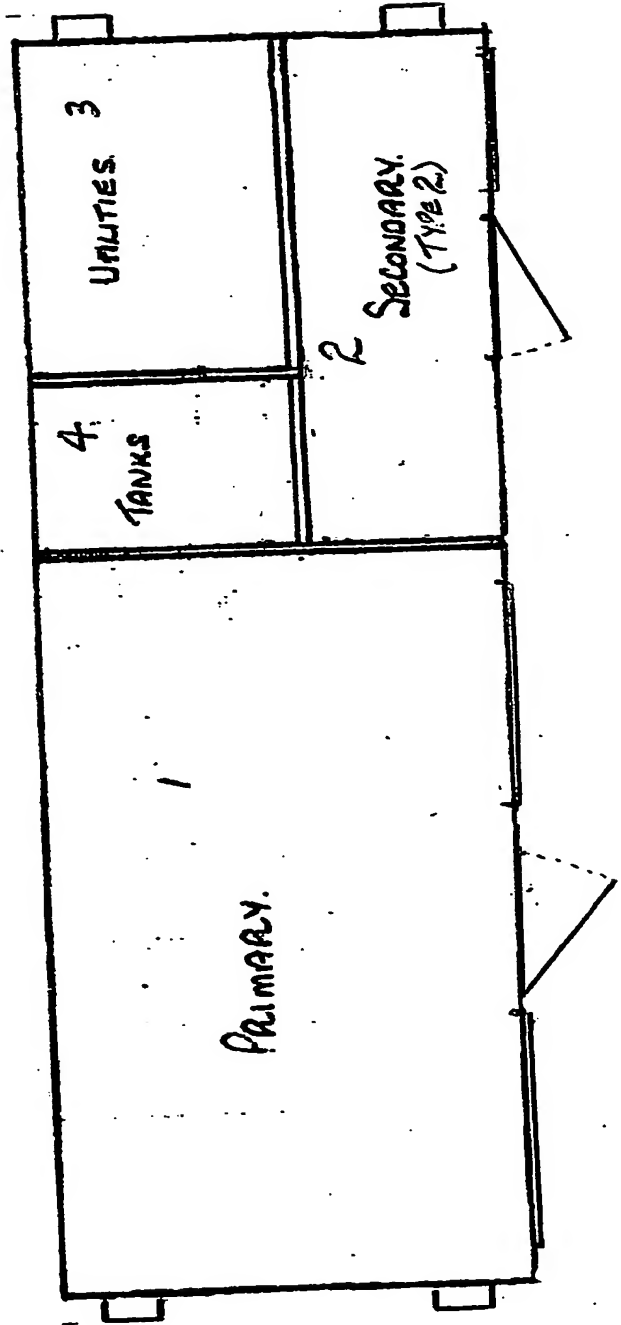
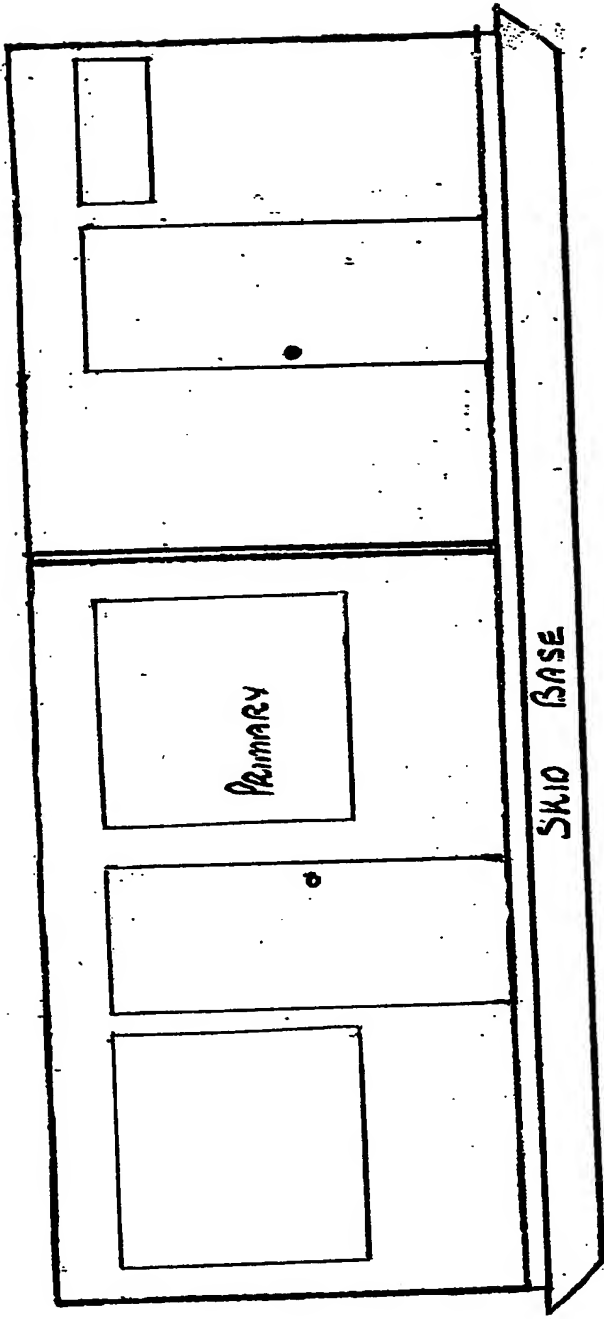


Fig 8

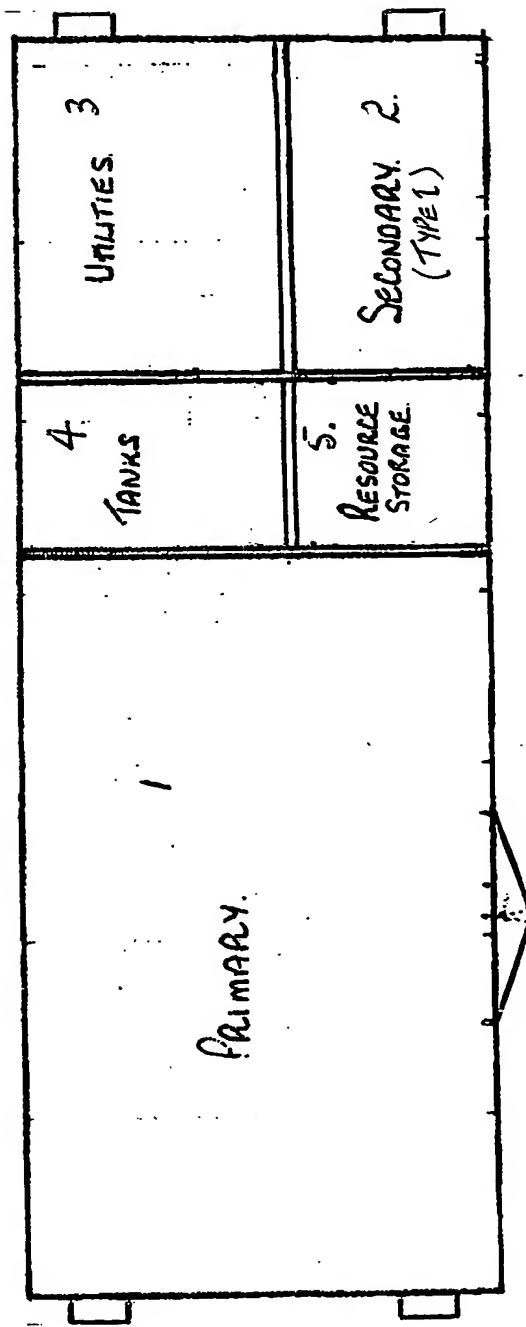
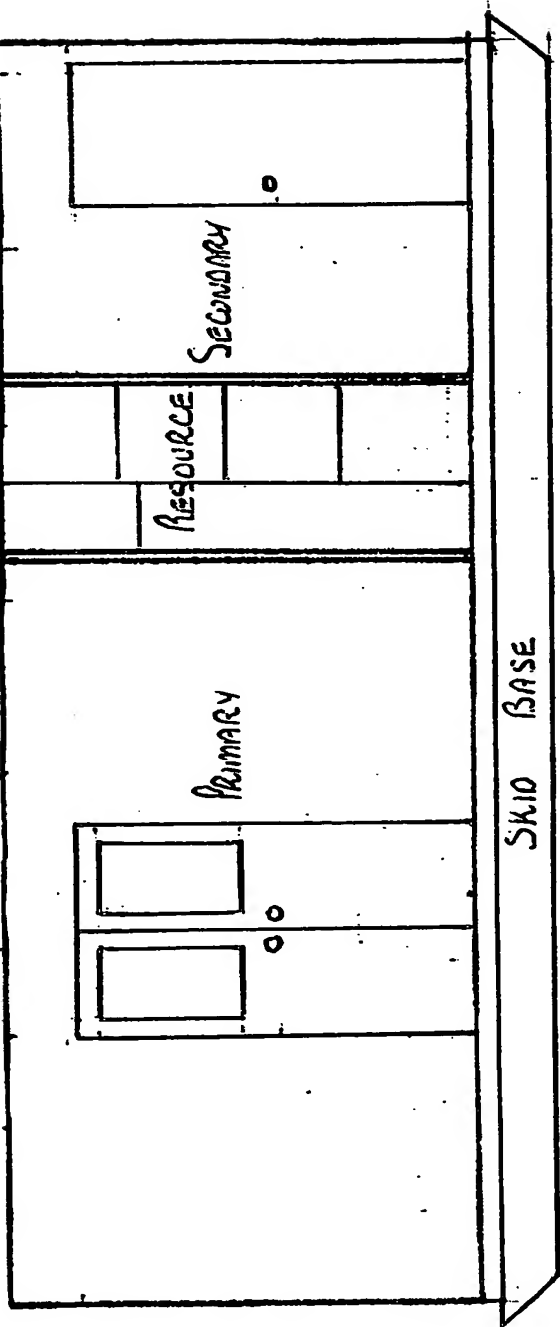


Fig 3

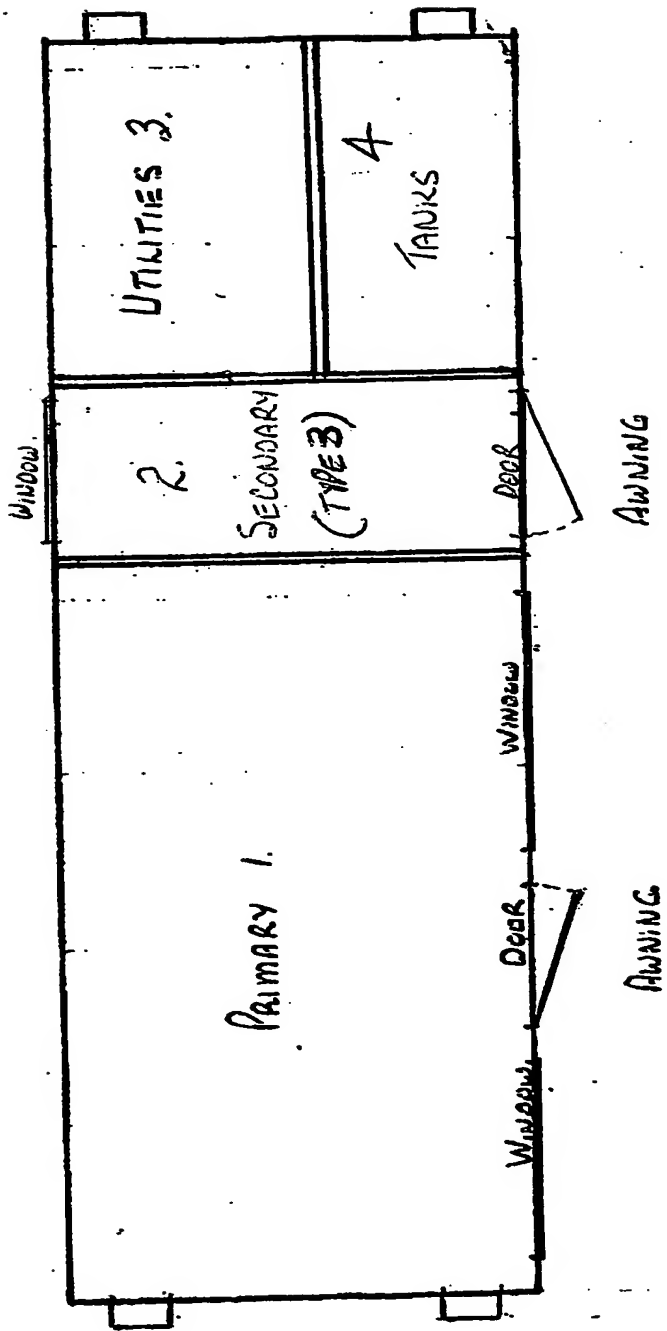
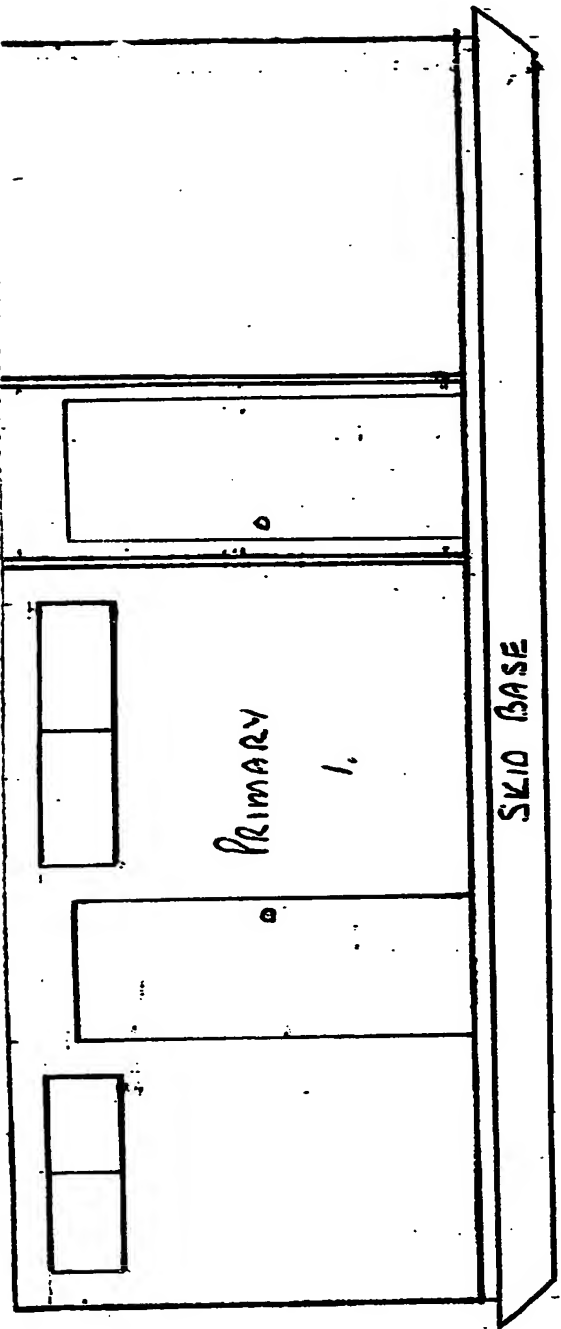


Fig 10

